

BNL-62991

CLOUD DROPLET NUCLEATION AND ITS CONNECTION TO AEROSOL PROPERTIES

S. E. Schwartz

Proceedings of the 14th International Conference on Nucleation and Atmospheric Aerosols, pp. 770-779, Elsevier Science Ltd., Oxford, UK, 1996.

Anthropogenic aerosols influence the earth's radiation balance and climate directly, by scattering shortwave (solar) radiation in cloud-free conditions and indirectly, by increasing concentrations of cloud droplets thereby enhancing cloud shortwave reflectivity. These effects are thought to be significant in the context of changes in the earth radiation budget over the industrial period, exertin a radiative forcing that is of comparable magnitude to that of increased concentrations of greenhouse gases over this period but opposite in sign. However the magnitudes of both the direct and indirect aerosol effects are quite uncertain. Much of the uncertainty of the indirect effect arises from incomplete ability to describe changes in cloud properties arising from anthropogenic aerosols. This paper examines recent studies pertaining to the influence of anthropogenic aerosols on loading and properties of aerosols affecting their cloud nucleating properties and indicative of substantial anthropogenic influence on aerosol and cloud properties over the North Atlantic.